

Bonfils assisted double lumen endobronchial tube placement in an anticipated difficult airway

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Abstract

The role of various airway adjuncts in the management of difficult airway has been described in the literature. Bonfils rigid fiberscope is one of the airway assist devices widely used for endotracheal intubation in the individuals with cervical instability warranting limited neck movements. With our experience in the utilization of Bonfils for single lumen endotracheal tube placement, we are increasingly using for double lumen endobronchial (DLT) intubation as well. We would like to describe our experience in the use of Bonfils for DLT placement and outline the merits and limitations of the other suitable airway assist devices in this report. The double lumen tube has to be modified by decreasing the length of DLT to accommodate the Bonfils fiberscope and this is applicable only in certain type of double lumen tubes for e.g. Bronchocath.

Key words: Bonfils, bronchocath, difficult airway, double lumen

Introduction

The successful institution of the one-lung ventilation is an essential element to conduct anesthesia in thoracic procedures warranting lung isolation. The methods such as double lumen tube (DLT), single lumen tube with a bronchial blocker, univent, EZ-blocker have been utilized to achieve successful one-lung ventilation. Among these, the lung separation using DLT, is the nonpareil method. Intubating with a DLT in a difficult airway can be demurring by its shape, size, and configuration. Various techniques have been reported in the literature for successful placement of DLT in a difficult airway. We are reporting our experience in using Bonfils retromolar intubation fiberscope for successful intubation with double lumen endobronchial tube in a patient with difficult airway.

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Access this article online

Quick Response Code:



Website:
www.joacp.org

DOI:
10.4103/0970-9185.142867

Case Report

A 79 year old male weighing 55 Kg with a height of 168 cm, was scheduled for right middle lobectomy for suspected lung carcinoma. His concurrent co-morbidities included hypertension, hyperlipidemia, and non-insulin dependent diabetes mellitus. Prior to this current procedure, he had successful diagnostic mediastinoscopy for his hilar lymphadenopathy. Previous intubation was noted to be challenging with Cormack and Lehane grade III larynx and with the aid of LMA CTrach™ (The Laryngeal Mask Company Limited, Germany), he was then uneventfully ventilated and intubated. Decision was made to utilize Bonfils retromolar intubating fiberscope (Storz, Germany) as first-line airway device to intubate the patient with a left sided DLT using a 37Fr left Broncho-Cath (Mallinckrodt Medical, Ireland). The DLT was modified to accommodate the Bonfils retromolar intubation fiberscope into the bronchial lumen of DLT. The connecting tubes of both tracheal and bronchial parts of DLT were shortened by 1.5 cm to accommodate the length of the Bonfils, and the endotracheal tube (ETT) holder of the Bonfils had to be removed [Figure 1].

The thoracic epidural at the level of T6-7 was placed prior to induction for intraoperative and postoperative analgesia. With adequate preoxygenation, anesthesia was induced with propofol and fentanyl, and muscle relaxation was achieved with rocuronium as authors were able to perform satisfactory bag and mask ventilation, and

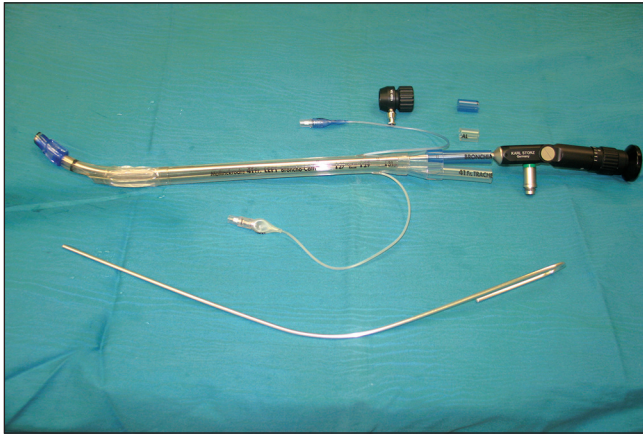


Figure 1: Bonfils fiberscope with modified bronchocath double lumen tube

patient was intubated with the pre-prepared left sided 37Fr DLT using Bonfils retromolar intubating fiberscope. The Bonfils allowed a right retromolar approach for intubation and the vocal cords were easily visualized. Once the DLT just passed the vocal cords the Bonfils fiberscope was withdrawn. The DLT was then rotated 90° and advanced until slight resistance was felt. The double lumen position was confirmed by both auscultation and fiberoptic bronchoscope (Storz, Germany). He had stable hemodynamics throughout the procedure and was extubated uneventfully at the end of the procedure.

Discussion

Placement of a DLT can be challenging in patients with difficult airway. Bonfils retromolar intubation fiberscope is one of the rigid fiberscopes used for successful placement of the endotracheal tube both in a normal and difficult airway. Various techniques have been described to achieve a successful double-lumen intubation in difficult airway. The commonest approach is to achieve tracheal intubation with single lumen tube with or without intubating aid. After successful placement of a single-lumen ETT, it is exchanged with a DLT using a tube exchanger. Occasionally the airway can be traumatized with this technique.^[1] Fiberoptic bronchoscope has widely been used for placing and confirming the position of DLT.

Bullard laryngoscope (BL) can be utilized to place DLT in lesser time with minimal hemodynamic disturbances, less cervical mobility and even in limited mouth opening. Shulman and Connolly obtained grade 1 laryngeal view in many occasions by using this tool in difficult airway for the placement of DLT.^[2] Since DLT loaded backwards in BL, there will be less control, while unloading and also reported higher incidences of wrong-sided bronchial placement, especially with Mallinckrodt DLT.^[2] The BL was found superior to

conventional laryngoscopy for the placement of ETT in a cervical instability individuals warranting airway protection though time for the placement of ETT is longer with BL. While using BL, radiographically documented neck movement was less even without manual in line stabilization compared with Mackintosh laryngoscope.^[3]

Lighted stylet is another suitable airway device extensively investigated to facilitate tracheal intubation in patients with normal and difficult airway, when direct laryngoscope or other approaches have failed.^[4] The conventionally available lighted stylets are too short to insert DLT, and the blue endobronchial cuff obscures the illumination. By cut shorting the DLT near the bifurcation end allows the tracheal stylet to place to the tip of the DLT, O'Connor and O'Connor were able to facilitate the DLT insertion into the trachea with fewer challenges. Prewarming DLT helps to bend the tip of the endobronchial tube prior to the placement of the stylet and to lift the jaw by the assistant warranted for successful intubation.^[4] Moreover, these type of lighted styles are suitable for smaller size DLT compared to larger DLT.

Another modified trachlight technique was described for successful DLT intubation by Chen *et al.* To avoid difficulty in inserting the trachlight into the DLT due to its thickness, they made an incision on the bronchial lumen of DLT just proximal to the point where the bronchial cuff pilot tube emerges.^[5] After the placement of the DLT, the incised part of bronchial lumen sealed to prevent the leakage. This technique is applicable for the widely used DLT. By combining the two-tracheal wands can avoid shortage of wand length with respect to the DLT, to facilitate the light wand insertion till the distal end of the DLT. This technique is only suitable for DLT size 37Fr, or larger, due to varying internal diameter and there is always possibility of separation of the wands upon removal from the DLT.^[6]

The GlideScope video intubation system is a camera laryngoscope that provides a laryngoscopic view equal to or even better than that of direct laryngoscope. It is designed to facilitate tracheal intubation with less difficulty and also be used to place DLT successfully with less airway related trauma.^[7] The stylet is relatively rigid, less malleable and though able to achieve better glottis visualization warranting upper-airway manipulation to facilitate insertion of the DLT. These type of scopes can be only used in certain types of DLT to accommodate the stylet. To overcome these limitations, a new video-stylet scope (OptiScope, Pacific Medical, Seoul, the Republic of Korea) was introduced for DLT. It has malleable tip with relatively longer length up to 40.5 cm and outer diameter of 0.5 cm to accommodate DLT 35 Fr or larger. Yang *et al.* in their comparative study of OptiScope™ with

Macintosh laryngoscope for DLT placement in all laryngeal grade, showed a significant advantage of Optiscope™ in terms of time to DLT placement with lesser incidences of external laryngeal maneuver, airway trauma, oral, and dental injuries.^[8]

Bonfils (Karl Storz GmbH, Tuttlingen, Germany) is an intubating rigid fiberscope with a curved tip used for successful intubation in a normal and difficult airway. This device has been used successfully in failed intubation with direct laryngoscope.^[9,10] Though the device was widely used for the placement of a single lumen tube, it was not utilized well in the placement of DLT. Bonfils created better intubating conditions in difficult airway for DLT compared to intubating laryngeal mask airway with lesser incidences of sore throat and hoarseness. The shorter preparation time, reusable rigid stylet, relatively less expensive compared to flexible fiberscope, makes Bonfils one of the superior devices. The scope cannot be inserted nasally and relatively large quantity of either secretions or blood in the airway passage challenges to utilize the Bonfils as there is no suction port.^[10,11]

We used the Bonfils in our case as the first choice due to our familiarity with the device. By inserting using classic technique of retro molar approach, damage to the tracheal and bronchial cuffs can be avoided especially with sharp canine and incisors. In many situations, jaw thrust maneuver aids for better visualization of the glottis. The Bonfils converted the difficult grade III larynx into a relatively simple intubation without need for tube exchanger in a difficult airway. To accommodate the rigid stylet into the DLT, certain modifications such as shortening the DLT by 1.5 cm is mandatory, and this could be possible in some types of DLT such as bronchocath.

Conclusion

We suggest Bonfils retromolar intubation fiberscope as a useful airway tool for a successful double-lumen intubation in an anticipated and unanticipated difficult airway.

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How to cite this article: Subramani S, Poopalalingam R. Bonfils assisted double lumen endobronchial tube placement in an anticipated difficult airway. *J Anaesthesiol Clin Pharmacol* 2014;30:568-70.

Source of Support: Nil, **Conflict of Interest:** None declared.